

any body of water in north-eastern America where all the other species are of common occurrence.

On August 16, 1933, near the Maine No. 1 highway, on Mr. Edward C. Currier's farm in the northern part of Houlton, I discovered a peat bog of about 4 feet in thickness. It was underlaid by a marl bed about a foot thick, and in this marl deposit is a lot of fresh water shells, all of which are of a large size for their species. *Lymnaea stagnalis* Linné is found in the top of the marl and must have been in abundance, as several specimens were there, all of a good size, but so brittle that only a few good specimens were secured.

The following is a list of the 14 species of shells observed:

<i>Valvata lewisi</i> Currier	<i>Gyraulus parvus</i> Say
<i>Physa heterostropha</i> Say	<i>Sphaerium sulcatum</i> Lamarek
<i>Lymnaea stagnalis</i> Linné	<i>Sphaerium rhomboideum</i> Say
<i>Fossaria obrussa decampi</i> Streng	<i>Musculum securis</i> Prime
<i>Helisoma trivolvis</i> Say	<i>Pisidium variabile</i> Prime
<i>Helisoma anceps</i> Menke	<i>Pisidium ventricosum</i> Prime
<i>Helisoma companulatum</i> Say	<i>Pisidium contortum</i> Prime

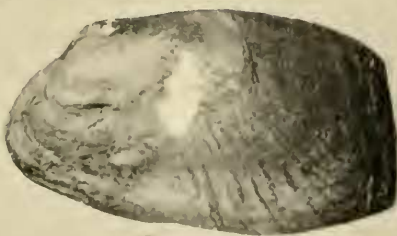
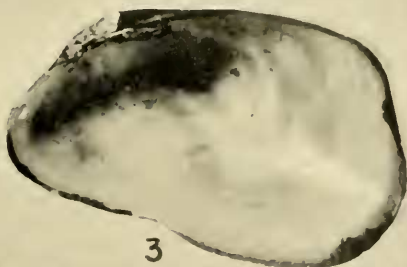
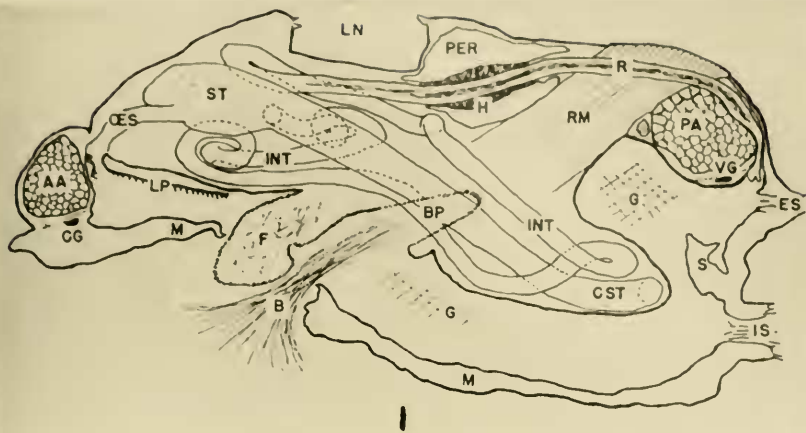
## A NEW TYPE OF FRESH WATER CLAM FROM BRITISH GUIANA

BY J. P. E. MORRISON<sup>1</sup>

The writer was fortunate enough to be a student during the 1925 summer session at the Kartabo Zoological laboratory of the University of Pittsburgh. Each student's work consisted principally of ecological observations and collections of animals of the group in which he was most interested. My own knowledge of mollusks was considerably broadened and increased by these first-hand studies in Tropical Animal Ecology, made possible largely through the efforts of my professors at the University of Chicago, Dr. W. C. Allee and Dr. H. C. Cowles.

Kartabo Point, widely publicized by Wm. Beebe in his books on the jungle life of British Guiana, proved to be relatively barren of Mollusca. Lying as it does in the second-growth jungle area of formerly extensive plantation clearings in the Guiana lowlands, the environment is much different from that of the

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*Guianadesma sinuosum*.



virgin jungle. The most productive habitat in the thickly matted second-growth forest is under or around fallen logs, where such species as *Euglandina surinamensis* Vernhout, *Leptinaria lamellata concentrica* Reeve, *Euconulus cassiquensis* (Newcomb), *Vitrea decolorata* (Drouet), *Stenopus cayennensis* (Pfr.), and *Succinea recisa* Morelet were found sparingly. In the area near the Cuyuni River, *Helicina* (*Sericca*) *sericea* Morelet was found in the leaf-mold and on trunks of the smaller trees, as far as eight feet above the ground.

Even five miles away, in the more open but more heavily shaded and higher-roofed virgin jungle, relatively fewer molluscan species were found. *Auris distorta sublaevis* Pilsbry, *Corona perversa* (Swainson), and *Orthalicus sultana* Dillwyn were taken from the trunks of certain smooth-barked jungle trees. *Drymaeus cinnamomeolineatus* (Moricand) on the other hand was found on the leaves and branches of some smaller trees near jungle clearings, as high as five feet from the ground. *Aperostoma* (*Cyclohidalgoo*) *translucida major* H. B. Baker and a slug, *Vaginulus* sp., were found here on the virgin jungle floor. Although intensive enough search was not made to disprove their presence, no smaller species of mollusks were evident on the jungle floor. In the Kartabo area it is never hotter than 89° F. in the shade of the jungle, but it might be that temperature every day in the year, coupled with almost 100 per cent humidity. The jungle environment here seems too monotonous to serve as much of a stimulus for the production or survival of a multitude of different species.

Some of the very few species of mollusks actually present at Kartabo have been introduced by man's agency since the Dutch first settled on Kyk-over-al Island, opposite Kartabo in the Mazaruni River, in the year 1626. It is probable, but not certainly known that the Spanish were there earlier. This island in midstream at the junction of the Cuyuni and Mazaruni Rivers, also commands the junction of the Mazaruni and the Essequibo, in sight just four miles downstream. A garrison here controlled the entire Essequibo district by controlling travel in the Essequibo basin. Even now such control is possible because all travel to and from the Mazaruni and Cuyuni diamond and gold fields is still by means of river boats. Among the smaller species of land

mollusks that were found mostly on Kyk-over-al Island, and that in all probability have been accidentally introduced by man sometime in the past 300 years are *Opeas goodalli* (Miller), *Subulina octona* (Brug.), *Streptaxis glaber* (Pfr.), and *Luntia insignis* Smith. *Bothriopupa tenuidens* (C. B. Ads.), found only in the leafmold in the dry season, but dotting the under side of shrubby leaves four feet off the ground during the wet season, was probably brought in from some other place in the Americas, as was the little helicimid, *Poenia lirata* (Pfr.).

The waters at Kartabo are transitional in character; 45 miles inland from the seven mile wide mouth of the Essequibo, the water is practically fresh, although tidal influence reaches beyond. The fall line, at the first rapids, is about 5 miles upstream in both the Mazaruni and the Cuyuni Rivers. There is about six feet of tide at Kartabo; in fresh waters this is not conducive to the survival of many molluscan species in the region.

All four species of mollusks of the ordinary freshwater types found here were restricted to waters out of the reach of the tide or were better developed in such situations. For example: there is a species of pill-clam (*Pisidium*) in the intermittent rain pools of the virgin jungle; one freshwater mussel, *Diplodon granosus* (Brug.), was found just 100 yards above the influence of the tide in a small tributary of the Cuyuni River at the fall line; the large apple snails (*Pomacea*), and the Black river snails, *Doryssa consolidata* (Brug.) are found at and above the fall line in abundance. Occasionally their shells are washed down as far as Kartabo in the drift, but only the *Doryssa* has been found living in the river near Kartabo, surviving there in small numbers in the reaches of tidal freshwater.

There are only two species of freshwater mollusks that belong to the transitional zone of the Cuyuni River, a small brackish water type of snail (*Littoridina*), and a very distinct type of byssiferous clam. This little clam, previously unnamed, has been more or less of a puzzle since it was first collected by Dr. Wesley Newcomb almost a century ago. Now determination of its gross anatomy by reconstruction from camera lucida drawings of serial longitudinal sections of the entire animal has made possible its correct taxonomic placement.

Family LYONSIIDAE (Thiele, 3: 936: 1934).

## GUIANADESMA, new genus.

Shell small, slightly inequivalve, rhomboidal, translucent, nacreous-porcellanous within, furnished with a variously wrinkled epidermis. Hinge anodont. Ligament short, internal, opisthodontic, that is posterior to the beaks, on a narrow ledge; without an ossicle. Pallial sinus broad, shallow. Right valve emarginate postero-ventrally.

Animal byssiferous, foot small, cylindrical; mantle largely united, with foot and byssal orifice and two short, separate siphons, with a briefly continued internal septum. Inner and outer branchiae subequal, free below from the abdominal sac and from the mantle.

Genotype: *Guianadesma sinuosum*, new species.

This genus differs from all other known members of the family in the complete absence of the lithodesma or shelly structure in the ligament. It might be placed in a separate family if it were not evident that the loss of only one character is of insufficient taxonomic value, this loss having also occurred in certain forms of the related family Pandoridae.

The single species known is estuarine, in practically fresh (tidal) water in the Essequibo drainage in British Guiana. *Guianadesma* is best regarded as a geographically isolated, aberrant member of the Lyonsiidae, which has lost the ligamental ossification, but has maintained the other general characters of the group during its transition to a freshwater habitat. Its most similar living relative seems to be *Agriodesma* Dall, 1909, from the southern California coast.

## GUIANADESMA SINUOSUM, new species. Plate 8.

Shell small, long rhomboidal, regularly slightly sinuous and inequivalve, periostracum light straw-colored; naere within hard, porcellanous, translucent whitish. Ligament short, opisthodontic, internal, without an ossicle, on a narrow ledge behind which is the wide shallow beak cavity; hinge anodont. The light straw-colored epidermis, becoming slightly darker with age, is wrinkled in a characteristic fashion on both valves; the anterior portion is wrinkled irregularly concentrically, to give the appearance of scaled fish skin; the median portion, in front of and over the posterior ridge, is raised into about twelve irregular or doubled radial epidermal folds; above the posterior ridge there is usually a return to a concentric folding; in some specimens both radial and concentric wrinkles are present above the posterior ridge. The

umbones, one-third from the anterior end, eroded even in the smallest specimens seen (4.5 mm. long), are apparently smooth. Adductor muscle scars subequal, the posterior the larger, in front of which are the large posterior retractor scars (in effect the byssal retractor muscle scars); anterior retractor and protractor scars small, inconspicuous. The pallial line is distant from the margin; the pallial sinus is shallow and wide, extending entirely across the posterior end of the shell. The left valve is usually evenly rhomboidal, the dorsal line straight to slightly arched below the umbones to meet the dorsally truncate anterior slope in a widely rounded curve. The anterior end is narrowly rounded at the base. The ventral margin is entire, straight to slightly curved; the posterior end abruptly truncate, the posterior point at the base. Sometimes the left valve is a little cut away post-ventrally, corresponding to the emargination of the right valve. The right valve is irregularly rhomboidal, differing in outline by an irregular ventral margin, which is broadly emarginate behind the middle, in the region of the radial epidermal wrinkles, and is not so abruptly truncate, but a little more evenly rounded behind. The shell is hardly sinuous above, but the post-ventral extension and overlap of the right valve produces a marked sinuosity below.

The type (U.S.N.M. No. 536901) was personally collected July 27, 1925 from rocks in the midstream of the Cuyuni River, opposite Kartabo Point, near its junction with the Mazaruni River, Essequibo District, British Guiana. The type measures: 17.3 mm. R., 17.4 mm. L., long; Height, 11.1 mm. R., 9.8 mm. L.; Diameter, 7.0 mm. There are a number of paratypes in the United States National Museum collections, and in those of the Carnegie Museum (collected by the writer and Joseph Benkert).

The animal is byssiferous, with a small cylindrical foot; the byssiferous gland and pit immediately behind and as large as the foot, extends through the abdominal sac to and connects with the large posterior retractor muscles. The adductor muscles are subequal, the posterior a little larger; the anterior retractor and protractor muscles are small and inconspicuous. The mantle margins are united except for the midventral foot and byssal aperture, and the two short, strong, separate siphons, whose separation is continued internally as a brief horizontal septum. Branchial siphon papillose; the gills are eulamelibranchiate, and free from both the visceral mass and the mantle below. There is no branchial septum. The labial palps are moderate in size, extending backwards almost to the base of the foot. There is a large crystalline style in a sac one-fourth as long as, and larger in